PEACE/WILLISTON
FISH & WILDLIFE
COMPENSATION
PROGRAM

BC hydro

BRITISH COLUMBIA

A Reconnaissance Survey Of Little Carbon Lake

A. R. McLean
1991

PWFWCP Report No. 108

105-02940/

The Peace/Williston Fish & Wildlife Compensation Program is a cooperative venture of BC Hydro and the provincial fish and wildlife management agencies, supported by funding from BC Hydro. The Program was established to enhance and protect fish and wildlife resources affected by the construction of the W.A.C. Bennett and Peace Canyon dams on the Peace River, and the subsequent creation of the Williston and Dinosaur Reservoirs.

Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave. 3rd Floor, Prince George B.C. V2L 3H9

Website: *www.bchydro.bc.ca/environment/initiatives/pwcp/*

This report has been approved by the Peace/Williston Fish and Wildlife Compensation Program Fish Technical Committee.

Citation: A. R. McLean. 1991. A reconnaissance survey of Little Carbon Lake. Peace/Williston Fish and Wildlife Compensation Program, Report No. 108. 20pp plus appendices.

Author(s): Allister R. McLean[1]
Address(es): [1] Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave., 3rd Floor Prince George, B.C. V2L 3H9

A RECONNAISSANCE SURVEY OF

LITTLE CARBON LAKE

WATERSHED: Peace River

DATE OF SURVEY: July 23. 1991

FIELD CREW LEADER: A.R. McLean

FIELD ASSISTANT: A.R. Langston

WILLISTON/PEACE FISHERIES COMPENSATION PROGRAM

B. C. HYDRO

ENVIRONMENTAL RESOURCES

and

B.C. ENVIRONMENT

RECREATIONAL FISHERIES BRANCH

REPORT PREPARED BY: A.R. McLean

REPORT EDITED BY: A.R. Langston/B.G. Blackman

RELEASED BY: _____

Ted Down, Regional Fisheries Biologist

LAKE: Little Carbon

SYSTEM NAME: Unnamed C.

A.S.A.P. REFERENCE NO.:

SYSTEM NO: 230-8469-073

DATA ON FILE FOR THIS SURVEY

Location	x	Dissolved O2/Temp. Profiles	x
Physical Data	x	Winter Dissolved 02/Temp. Profiles	x
Bench Mark	x	Netting Record	x
Terrain Features	x	Lake Catch Summary	x
Access	x	Individual Fish Data	--
Resorts and Campsites	x	Fish Preserved	--
Other Developments	x	Stomach Analysis	--
Obstructions and Pollutions	x	Scale Reading	--
Special Restrictions	x	Location of Inventory Sites	x
Aquatic Plants	x	Photograph Directory	x
Wildlife Observations	x	Appendices:	
Miscellaneous Comments	x	A: Water Chemistry Analysis	x
Lake Drainage	x	B: Tributary Stream Data	--
Fisheries Management Comments	x	Bathymetric Map Reduction	x
History of Previous Surveys	x	Bathymetric Map	x
Water Chemistry Summary	x		

LOCATION

Location: 41 km west southwest of Hudson's Hope
Elevation: 1387 m +/-
Latitude/Longitude: 55°58'46:122°35'44" U.T.M.: 10.5252.62036
Management Unit: 7-31 N.T.S. Map No.: 93-0/15

Drainage: Unnamed C. --> Carbon C. --> Williston Reservoir (Peace Reach) --> Peace R.

PHYSICAL DATA

Lake Drainage Area:	—	km^2	Volume:	151500	m^3
Water Surface Area:	37300	m^2	Flushing Rate:	--	
Area above 6 m contour:	27300	m^2	Perimeter of Islands:	--	m
Shoreline Perimeter:	900	m	Number of Islands:	0	
Maximum Depth:	10.3	m	Mean Depth:	4.1	m
Filterable Residue (TDS):	28	mg/l	Secchi Reading:	6.0	m

Sounding Device: Lowrance X-15 Elevation Source: Contour interpolation

BENCHMARK

(Iron spike, center of red circle) located at lake outlet, 4.0 m from water's edge, in a 30 cm diameter spruce tree. Bench mark is set 2.0 m above current lake level.

High water mark: Lake appears to be at maximum pondage.

Lake: **Little Carbon**

TERRAIN FEATURES

Immediate Shoreline:

An intermittent fringe of alder, separated by rock bluffs and boulder outcroppings, fronts the shoreline. Shoreline slope to water's edge is low, with the exception of the northeast shore, which is steeply sloped. Shoreline substrate consists primarily of boulder/cobble and some gravel/silt, with the north and south ends consisting of organics and fines. Lake bottom drops off quickly, with the exception of the gradually sloped north and south ends. Boating access to and from shore is good. However, due to its remoteness and elevation (approx. 2 hour hike from Carbon Lake), it is unlikely boats, other than inflatable types, will be taken to this lake.

Surrounding Country:

Little Carbon Lake is a remote sub-alpine lake, located on top of a ridge in the Rocky Mountain Foothills. Forest cover is complete, mature, first growth, consisting of a 50/50 mix of pine and spruce. A steep, treed, rocky ridge is present along the northeast shore. To the south and west is a view of forest tree tops, beyond which the edge of the forest drops off. To the north is a unique, close-up view of Battleship Mountain.

Little Carbon Lake is situated within the Englemann spruce-subalpine fir biogeoclimatic zone.

Lake: **Little Carbon**

ACCESS

Directions:

Little Carbon Lake is approximately a 3 minute helicopter flight from the main bridge crossing (Burns Road) on Carbon Creek.

Alternately, follow signs from Hudson's Hope to the W.A.C. Bennett Dam (approx. 15 km west of Hudson's Hope). Cross the dam and proceed approx. 100 m, turning right onto the first gravel road (Utah Main Forest Service Road). Travel approx. 6 km on the Utah Main Forest Service Road. At this point the road name changes to Table Creek. Travel 2.5 km on the Table Creek Road turning right at the hair pin turn located approx. 150 m past the Gaylard Creek bridge crossing. Travel approx. 18 km on the Johnson Creek Forest Service Road to the Carbon Lake Recreation Site (km 64) sign located on road. Turn right and proceed approx. 150 m to waters edge. A boat may be used to cross the lake or alternately via a beaver dam located just downstream of the Recreation Site on Carbon Lake. A steep rough game trail is reported to exist along the ridge up to Little Carbon Lake (approx. 2 hr hike). Total distance from Hudson's Hope to Little Carbon Lake is approx. 41.75 km.

Road Type and Conditions:

None.

Restrictions:

None noted.

RESORTS AND CAMPSITES

Discussions are in progress with B.C. Forest Service (Dawson Creek) with regards to upgrading the trail to the lake and creating a day-use recreation site on the south shore, should this lake be stocked.

OTHER DEVELOPMENTS

None.

Lake: **Little Carbon**

OBSTRUCTIONS AND POLLUTIONS

The very small, steep outlet (with subterranean flow at times) is impassable to upstream fish movement. Downstream movement of fish is highly unlikely, but not certain.

A series of cascades/falls start approximately at 70 m and 300 m downstream of the lake. Visual observations indicate these cascades/falls are definite barriers to upstream salmonid migration.

SPECIAL RESTRICTIONS

None noted.

AQUATIC PLANTS

None observed.

WILDLIFE OBSERVATIONS

Moose tracks.

MISCELLANEOUS COMMENTS

1. Moderate densities of Gammarus were noted in the lake.
2. Dense concentrations of zoo and phytoplankton were also observed.
3. The owners of Carbon Lake Lodge have indicated an interest in improving the trail, promoting hiking to, and angling of Little Carbon Lake.
4. Bathymetric map: The lake outline is from an enlargement of aerial photograph RC 78087 No. 149, flown July 1978.

Lake: **Little Carbon**

LAKE DRAINAGE

General:

Little Carbon Lake has one intermittent inlet and one outlet. The outlet flows approximately 5 km southwest to its confluence with Carbon C.

Major Systems:

There are no major systems.

Minor Systems:

Unnamed C. - outlet

The outlet drains the lake on the west shore. The first 70 m of the outlet creek has 50% subterranean flow, with fines present. With a water temperature of 13.0 °C, the outlet had an average wetted width of 0.7 m. A series of falls and cascades are present after the initial 70 m and at 300 m downstream of the lake. This creek offers no salmonid spawning or rearing habitat.

Unnamed C. - inlet

This seasonal inlet was dry at the time of survey and offers no fisheries potential.

Lake: **Little Carbon**

FISHERIES MANAGEMENT COMMENTS

This sub-alpine lake is believed to be barren of all fish species. One net set, and two minnow traps fished for five hours, and captured no fish. The outlet offers no spawning or rearing habitat. However, suitable spawning substrate was noted along the lake shore. Moderate densities of fresh water shrimp were observed. Numerous cascades/falls are present on the outlet, some of which are barriers to upstream fish passage. Dissolved oxygen measurements taken during the winter of 1990/91 indicate sufficient levels to support a fish population.

This lake is suitable for a sportfish introduction. The outlet stream may not be a barrier to downstream fish movement, therefore any fish introductions should consider potential impacts on native fish species in the Carbon Creek Drainage. Carbon Creek has had stocks augmented by a stocking program of rainbow trout (1990, 1991, 1992) and kokanee (1990, 1991, 1992).

HISTORY OF PREVIOUS SURVEYS

Lake Surveys:

An oxygen/temperature series was collected on Little Carbon Lake on March 18, 1991 by A.R. McLean, Williston/Peace Fisheries Compensation Program, Prince George.

Other Related Surveys:

None known.

Lake: **Little Carbon**

WATER CHEMISTRY SUMMARY **Limnology Station No. 1**

Field Conditions:

Date:	July 23, 1991		
Time:	1400 hrs	Air Temperature:	29.5 °C
Wind Velocity:	5 km/hr	Wind Direction:	south
Cloud Cover:	1 /10 o.c.	Surface Condition:	light
Secchi Disc:	6.0 m	Water Colour:	light green

Method(s) Used:

Dissolved Oxygen:	YSI model 58 oxygen/temperature meter
Water Temperature:	YSI model 58 oxygen/temperature meter
Air Temperature:	Hand-held alcohol thermometer
Ph (field):	Hach Ph field test kit
H2S (field):	Hach H2S field test kit
Laboratory Used:	Zenon Environmental Inc. B.C. Laboratory Services
Water Sampler:	Verticle Alpha Water Bottle (Vandorn)
Substrate Sampler:	Substrate sample not taken

Water Sample Chemistry: SEAM Site No.: Not determined.

	Sampling Depths			
	Surface (0 m)		Lower (9.0 m)	
pH (field)	7.0		6.3	
pH (lab)	7.1		6.7	
Specific Conductance (lab)	28	umhos/cm	28	umhos/cm
Filterable Residue 105°C (lab)	28	mg/l	28	mg/l
H2S (field)		mg/l	0.0	mg/l

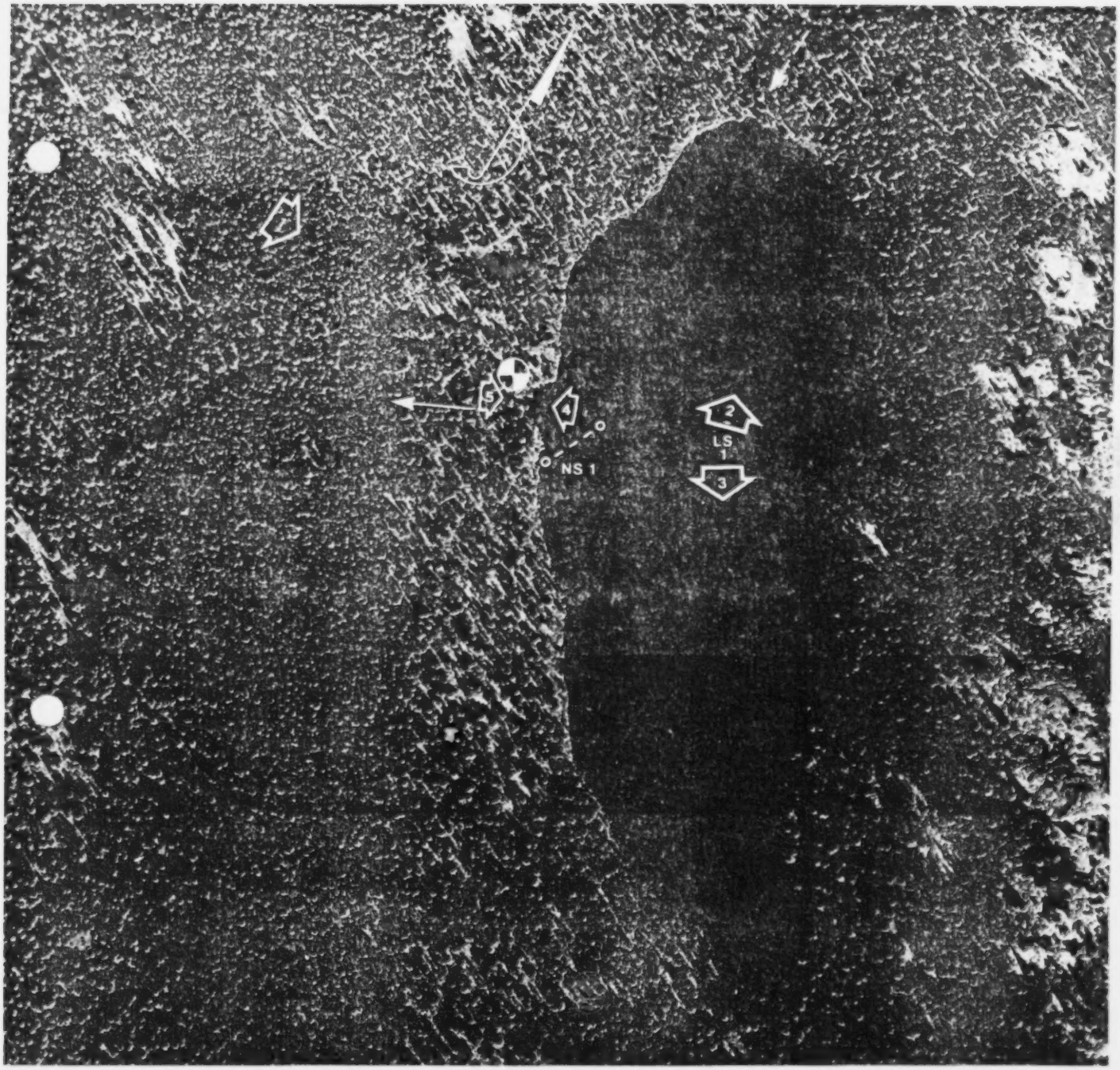
Bottom Depth:	9.5	m
Substrate Sample Depth:	--	m

Lake: **Little Carbon**

DATE: July 23, 1991

SUMMER OXYGEN/TEMPERATURE DATA

DEPTH (m)	02 (mg/l)	TEMP (°C)
Surface	8.8	16.7
1.0	9.1	14.8
2.0	9.5	14.1
3.0	9.5	13.6
4.0	9.5	13.2
5.0	9.5	12.7
6.0	10.4	10.8
7.0	9.3	9.1
8.0	7.1	8.6
9.0	6.1	8.4
9.5	Bottom	



1	Plate number, area, and direction
2	Point sample, number, and location
	Bench mark
LS 1	Limno station location and number
0 - - - 0 NS 1	Netting site location and number
1	Stream flow direction and number

LOCATION OF INVENTORY SITES

Figure 1

Lake: Little Carbon

Reference No.: B.C. 78087:149

Reference Date: July, 1978

Scale 1:2158

Lake: **Little Carbon**

DATE: March 18, 1991
Time: 1100 hrs
Air temp.: 7 °C
Wind: nil

CREW: A.R. McLean
Snow depth: 10 cm
Ice depth: 65 cm
Weather: overcast

WINTER OXYGEN/TEMPERATURE DATA

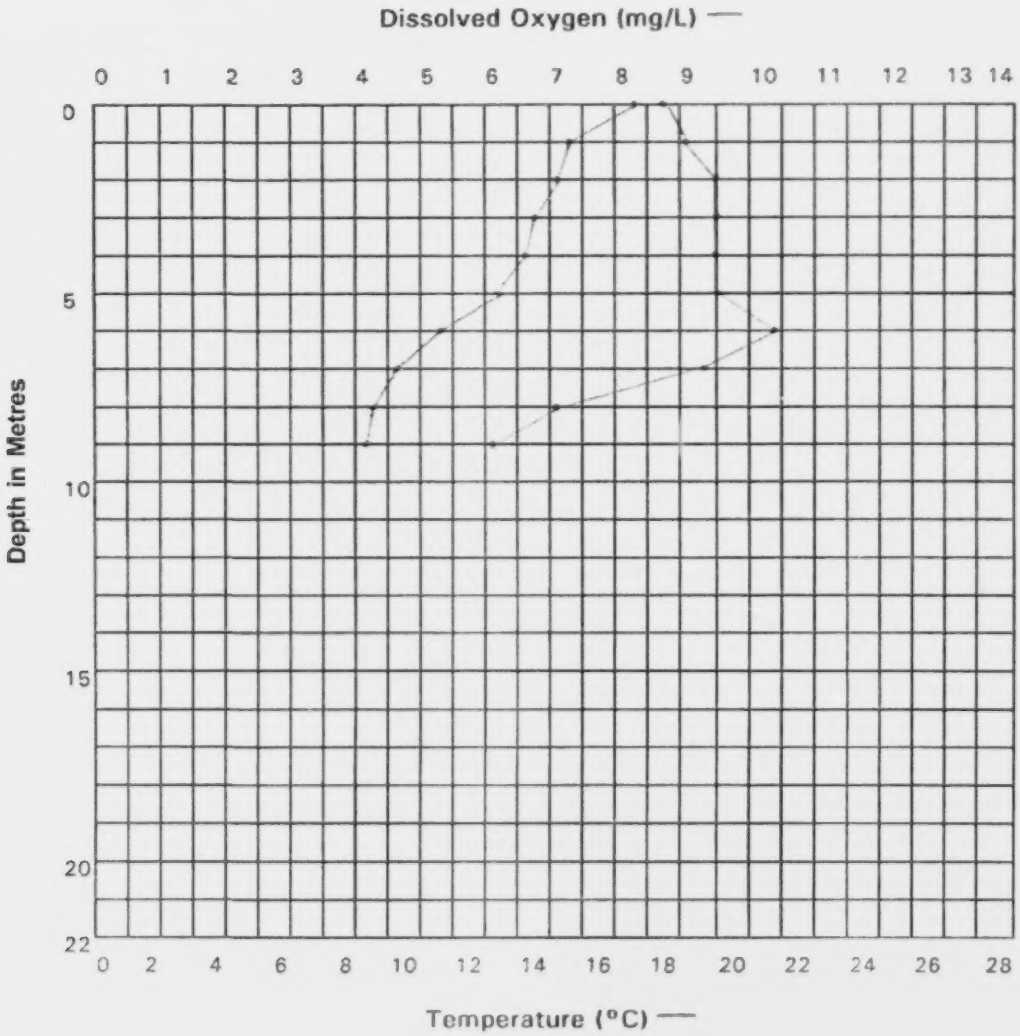
DEPTH (m)	02 (mg/l)	TEMP (°C)
Surface *	-	-
1.0	8.5	0.5
1.5	7.2	1.5
2.0	8.6	1.7
2.5	6.5	3.0
3.0	6.0	3.1
3.5	3.3	3.5
4.0	2.0	3.8
4.5	1.4	4.0
5.0	1.0	4.1
5.5	0.8	4.2
6.0	0.7	4.3
6.5	0.7	4.3
7.0	0.5	4.4
7.5	0.5	4.4
8.0	0.4	4.5
8.7	Bottom	

* Surface if referenced from top of ice, ie. surface = top of ice.

Lake: Little Carbon

SUMMER

DISSOLVED OXYGEN AND TEMPERATURE SERIES



Lake: **Little Carbon**

NETTINGRECORD

Mesh sizes experimental order: 25, 76, 51, 89, 38, 64 mm

NETTING SITE #1

Type:	Sinking monofilament		
Date Set:	July 23, 1991	Time:	1100 hrs
Date Lifted:	July 23, 1991	Time:	1615 hrs
Net Dimensions:	Length: 91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth:	1.0 m
		Substrate:	cobble/boulder
Deep End Mesh Size:	64 mm	Depth:	7.5 m
		Substrate:	organics

Lake: **Little Carbon**

LAKE CATCH SUMMARY

No fish netted.

Minnow Traps:

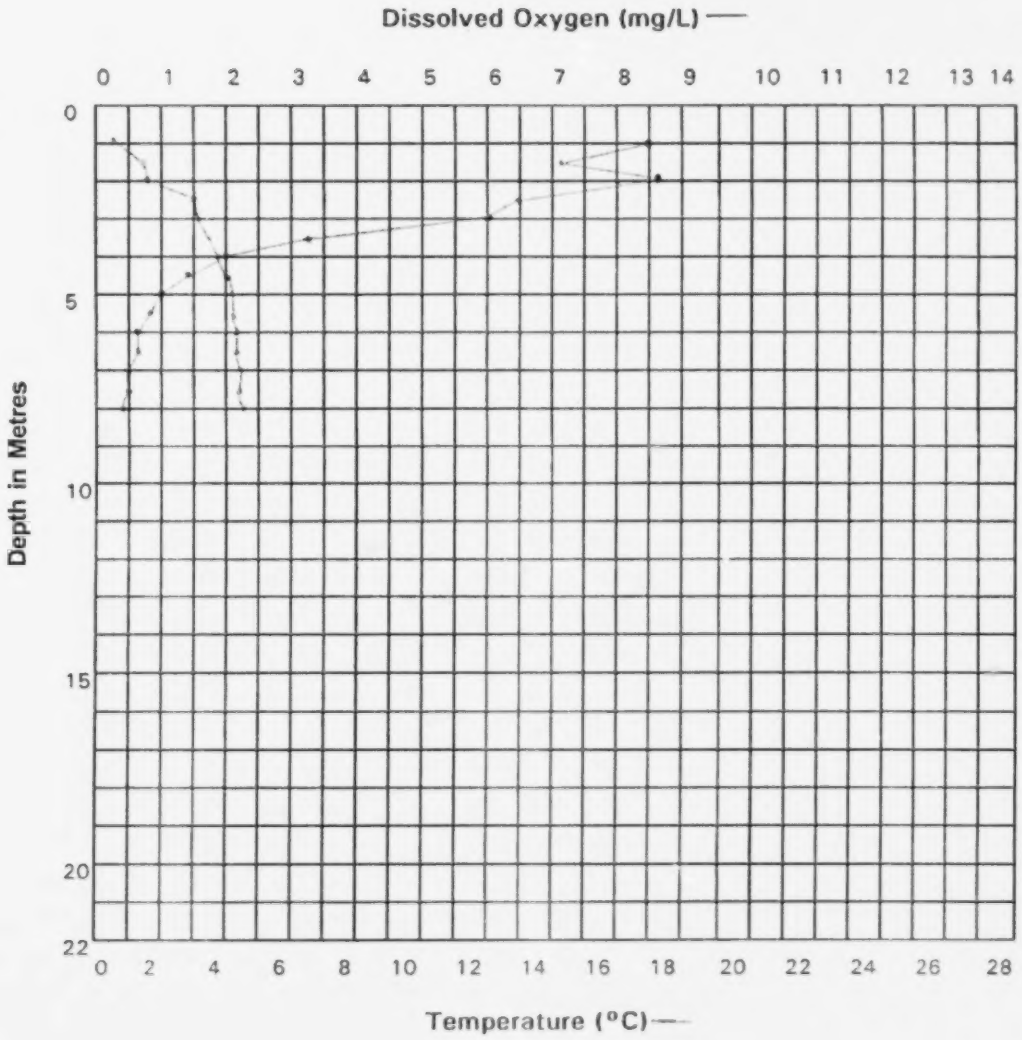
BAIT: Sardines

#	HOURS	DEPTH (m)	SUBSTRATE	SPECIES	SIZE RANGE (cm)
1	5.00	1.0	silt/gravel/cobble	Nil	
2	5.00	1.0	silt/gravel/cobble	Nil	

Lake: Little Carbon

WINTER

DISSOLVED OXYGEN AND TEMPERATURE SERIES



Lake: **Little Carbon**

PHOTOGRAPH DIRECTORY

Negative #	Plate #	Description
R9:14	1	Aerial view of Little Carbon Lake looking east.
R9:22,23	2	Panoramic view of shoreline looking north from limno station. Note Battleship Mountain in background.
R9:24,25	3	Panoramic view of shoreline looking south from limno station.
R9:21	4	View of outlet creek, taken from lake.
R9:19	5	View looking upstream at outlet creek, taken approx. 15 m downstream from lake. Note subterranean flow in foreground.

Lake: **LITTLE CARBON**

Plate 1: Aerial view of Little Carbon Lake looking east.

Plate 2: Panoramic view of Little Carbon Lake shoreline looking north from limno station. Note: Battleship Mountain in background.

Lake: **LITTLE CARBON**

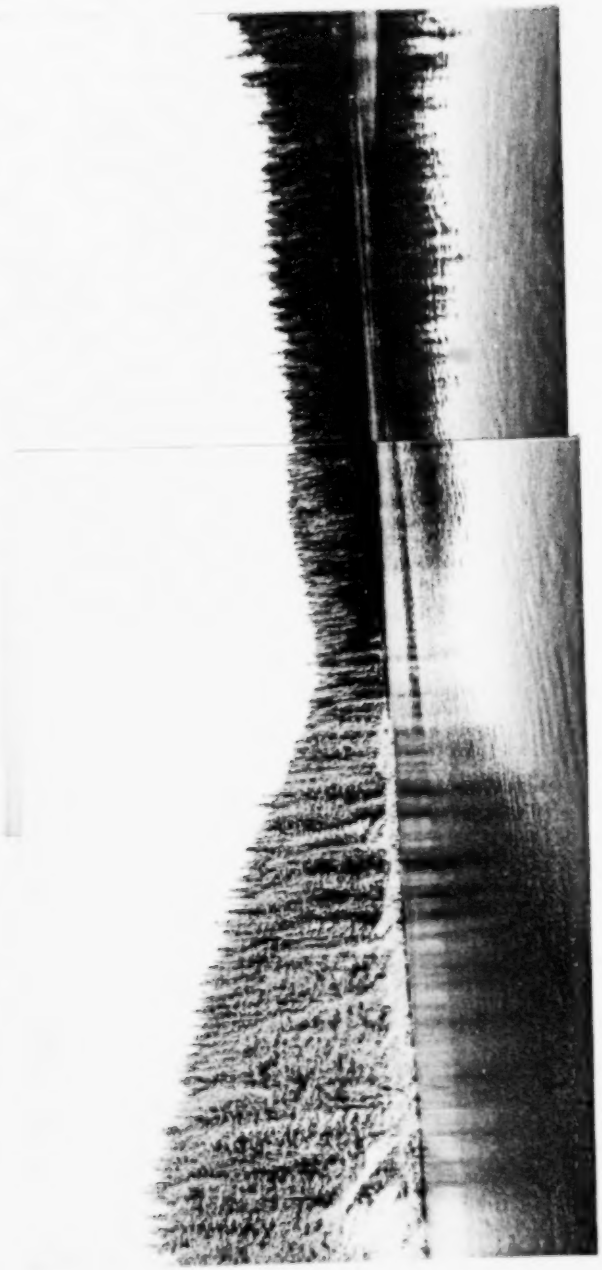


Plate 3: Panoramic view of Little Carbon Lake shoreline looking south from limno station.

Lake: **LITTLE CARBON**

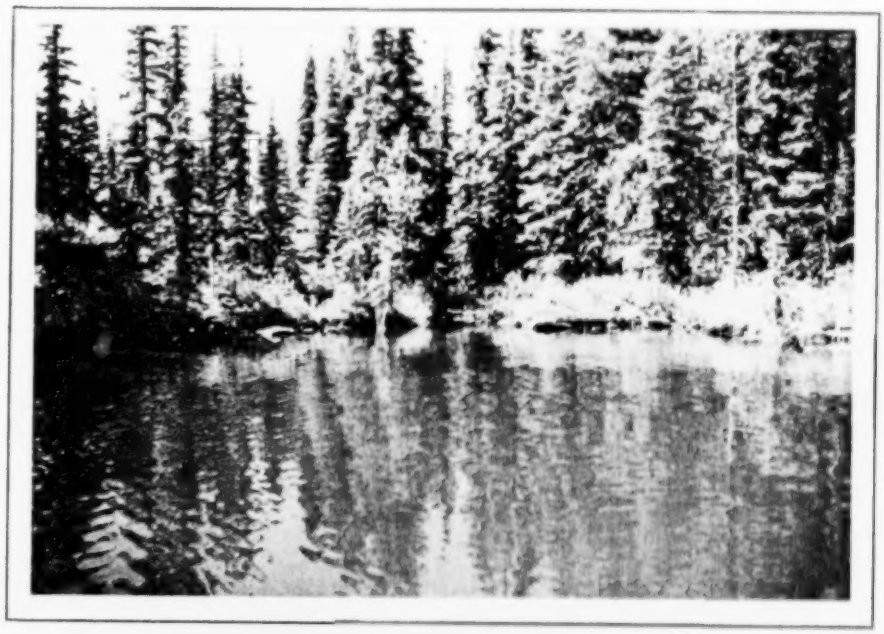


Plate 4:
View of outlet creek taken from lake.

Plate 5:
View looking upstream at outlet, taken approx. 15m downstream of lake.

Note: Subterranean flow in foreground.

Lake: Little Carbon

Appendix A

LABORATORY REPORT

Water Chemistry Analysis

B.C. LABORATORY SERVICES
Report For Form 03000104
FISH - PRINCE GEORGE ATTN: ALLISTER McLEAN

Site: NOSITE UNNAMED LAKE

Submitted by (23256) BLACKMAN B

Address (07) Waste Management Branch
Northern Region
3rd Floor, 1011 4th Avenue
Prince George, BC V2L 3H9

Phone No 565-6944

Audit Sample ( )
Client study reference code ( )
Sampling agency code ( )

Site (NOSITE) UNNAMED LAKE

Sample Adjective ( )
Sample State (FW) Fresh Water
Sample Descriptor (GE) General

This form was processed to the computer on 26-JUL-1991 as REGULAR
The cost for analyzing samples for this form is

Routine analysis	$	116.84
Special analysis	$	0.00
Total	$	116.84

AUG 21 1991
RECEIVED
PRINCE GEORGE

Site: NOSITE UNNAMED LAKE

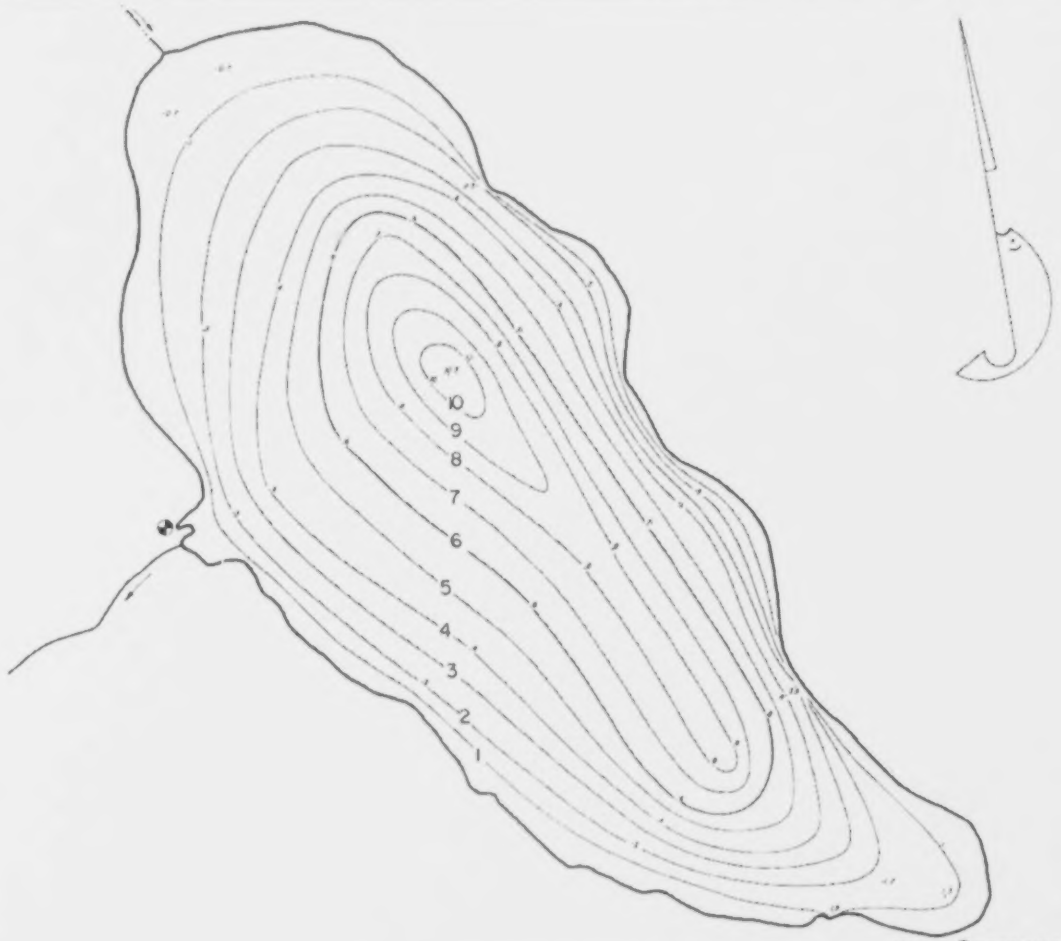
From :91/07/23 0001 To :91/07/23 0001
Depth Range 0.0 0.0 Tide :
Sample State: Fresh Water
Sample Comment:

Parameter Description	Result	Units	Analytical Technique (Sparcode/Medium/Pres'n)
pH	7.1	pH units	Automated pH Meter (00041220/02/01)
Residue Nonfilt	< 1	mg/L	Gravi 9 cm Buchner, 105C (00081070/02/01)
Specific Conductance	28	uS/cm	Cond Meter Siebold (00111160/02/01)
Res Filterable 1 Ou	26	mg/L	Gravimetric 1 Ou Filter (007H1032/02/01)
Alkalinity Total 4.5	16.4	mg/L	Automated Electrometer (01021210/02/01)

Site: MOSITE UNNAMED LAKE

From : 91/07/23 0002 To : 91/07/23 0002
Depth Range : 9.0 9.0 Tide
Sample State: Fresh Water
Sample Comment:

Parameter Description	Result	Units	Analytical Technique (Sparcode/Medium/Pres'n)
pH	6.7	pH units	Automated pH Meter (00041220/02/01)
Residue Nonfilt.	2	mg/L	Grav; 9 cm Buchner, 105C (00081070/02/01)
Specific Conductance	20	uS/cm	Cond. Meter Siebold (00111160/02/01)
Res. Filterable 1.0u	28	mg/L	Gravimetric 1.0u Filter (007H1032/02/01)
Alkalinity Total 4.5	17.8	mg/L	Automated Electrometer (01021210/02/01)



Reduced to
50%
of Original

NOTES: 1. Denotes BENCH MARK 2. This Map Not Intended for Navigational Use. Uncharted Rocks and Shoals May Exist.

INSET MAP
Scale 1:600 000

SURVEYED BY: A.R. McLEAN DATE: JULY 23, 1981
OUTLINE SOURCE: AIRPHOTO BC 78087 149 (JULY 1978)

STATISTICS AT TIME OF SURVEY

ELEVATION	1390 m.ɛ
SURFACE AREA	57 300 sq. m.
AREA ABOVE 6m. CONTOUR	27 300 sq. m.
VOLUME	181 500 cu. m.
MEAN DEPTH	4.1 m.
MAX. DEPTH	10.5 m.
PERIMETER, MAIN SHORE	900 m.
PERIMETER, ISLANDS	m.
BENCH MARK HEIGHT ABOVE WATER LEVEL	2.0 m.

Province of British Columbia
Ministry of Environment

FISHERIES BRANCH
INVENTORY OPERATIONS

LITTLE CARBON LAKE.

DEPTHS IN METERS

WATERSHED CODE: 230-6468-075	U.T.M. CO-ORDINATE: 10 525150 6003645	
M.U.: 7-31	FAM DWG: B.A.D.	REV. DATE:
PLOTTED: M.S.D.	FAM DWG CHECK: D.W.C.	SCALE: 1:1000
CONTOURS: J.A.B.	DRAFT DATE: FEB 20/1982	
CALCULATIONS: D.W.C.	APPROVED:	N.T.S. NO: 930/15
TECH. CHECK: D.W.C.		